

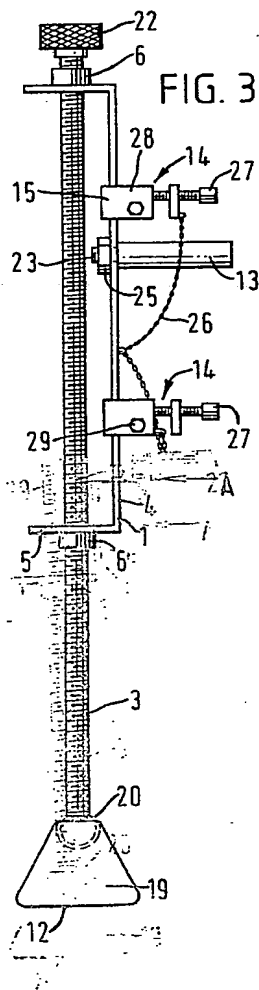
(12) UK Patent Application (19) GB (11) 2 124 691 A

- (21) Application No 8316849
- (22) Date of filing 21 Jun 1983
- (30) Priority data
- (31) 8217856
- (32) 21 Jun 1982
- (33) United Kingdom (GB)
- (43) Application published 22 Feb 1984
- (51) INT CL³
E06C 7/44
- (52) Domestic classification
E1S LW3
- (56) Documents cited
GB 1358701
GB 0836612
GB 0593083
GB 0153128
US 4209078
US 4090586
- (58) Field of search
E1S
- (71) Applicants
Kevin Edward Eade,
258 Caledonian Road,
London N1.
- (72) Inventors
Kevin Edward Eade
- (74) Agent and/or Address for
Service
Lloyd Wise Tregear and
Co.,
Norman House,
105-109 Strand,
London WC2R 3AE.

(54) Ladder levelling leg

(57) A device is described for levelling a ladder or the like for use on a sloping or stepped surface. A body member of the device is provided with means 14 for releasably coupling a leg of a ladder or the like to a body member. A base 19 in abutment with the sloping or stepped surface provides support for the device

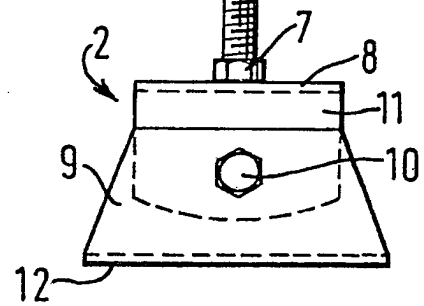
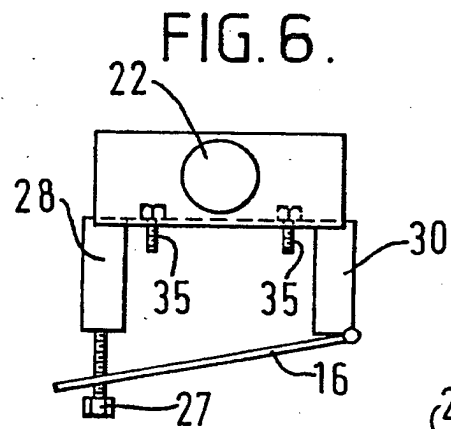
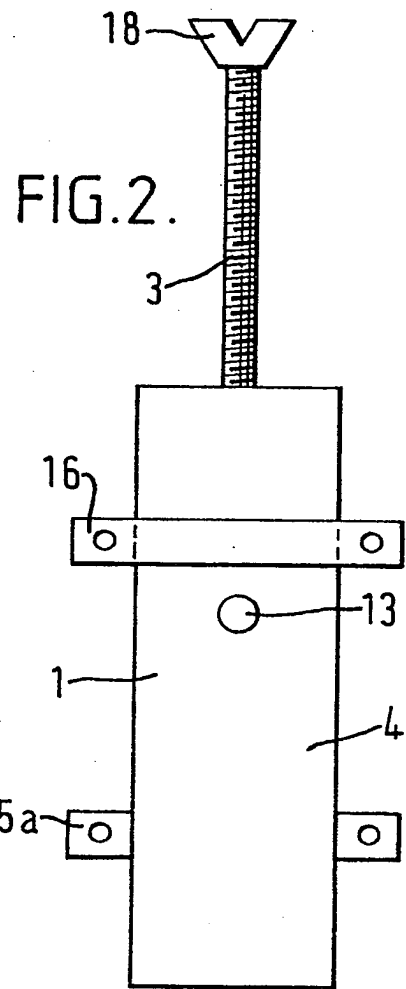
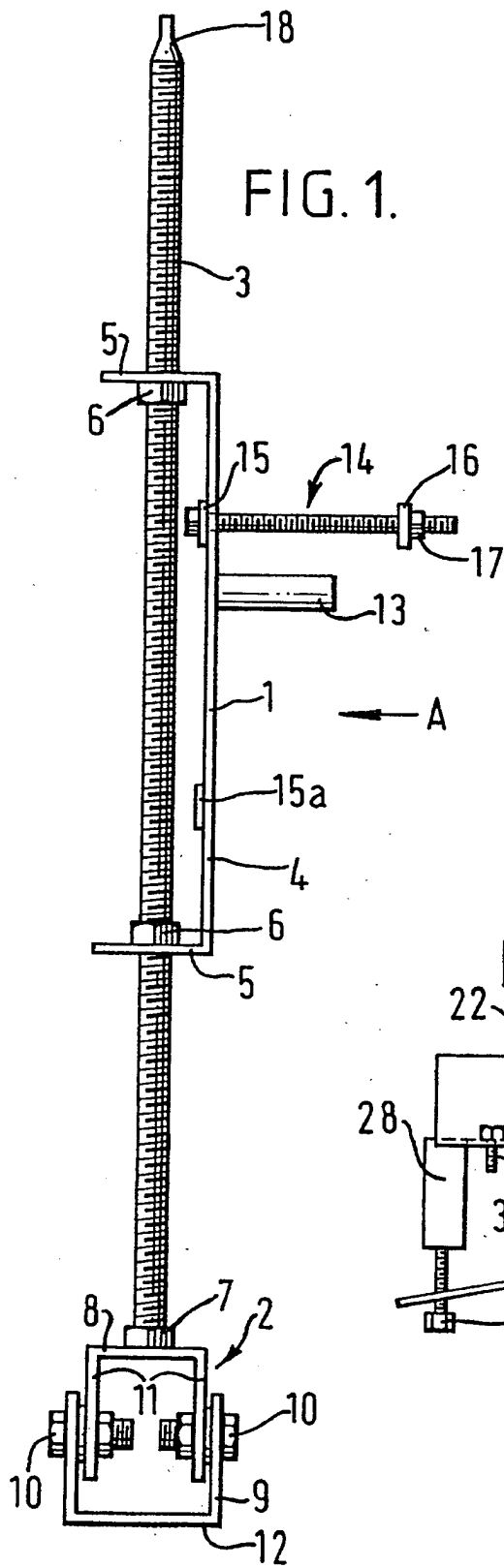
and for the leg of the ladder or the like coupled to said body member, the other leg of the ladder or the like being supported directly from the surface. An elongate rod 3 upstands from the base, and supports the body member. The elongate rod is rotatable relative to the body member and/or to the base and is threadedly engaged with one or both of the body member and the base whereby rotation of the elongate rod is effective to vary the separation between the base and the body member.

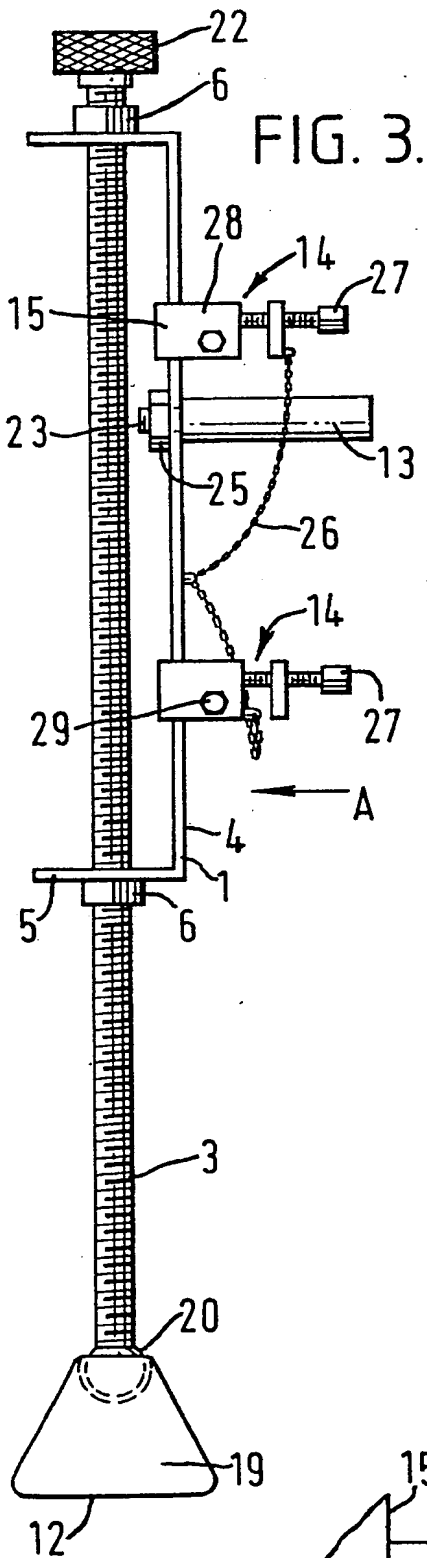


The drawings originally filed were informal and the print here reproduced is taken from a later filed formal copy.

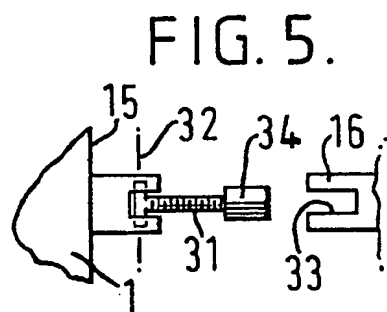
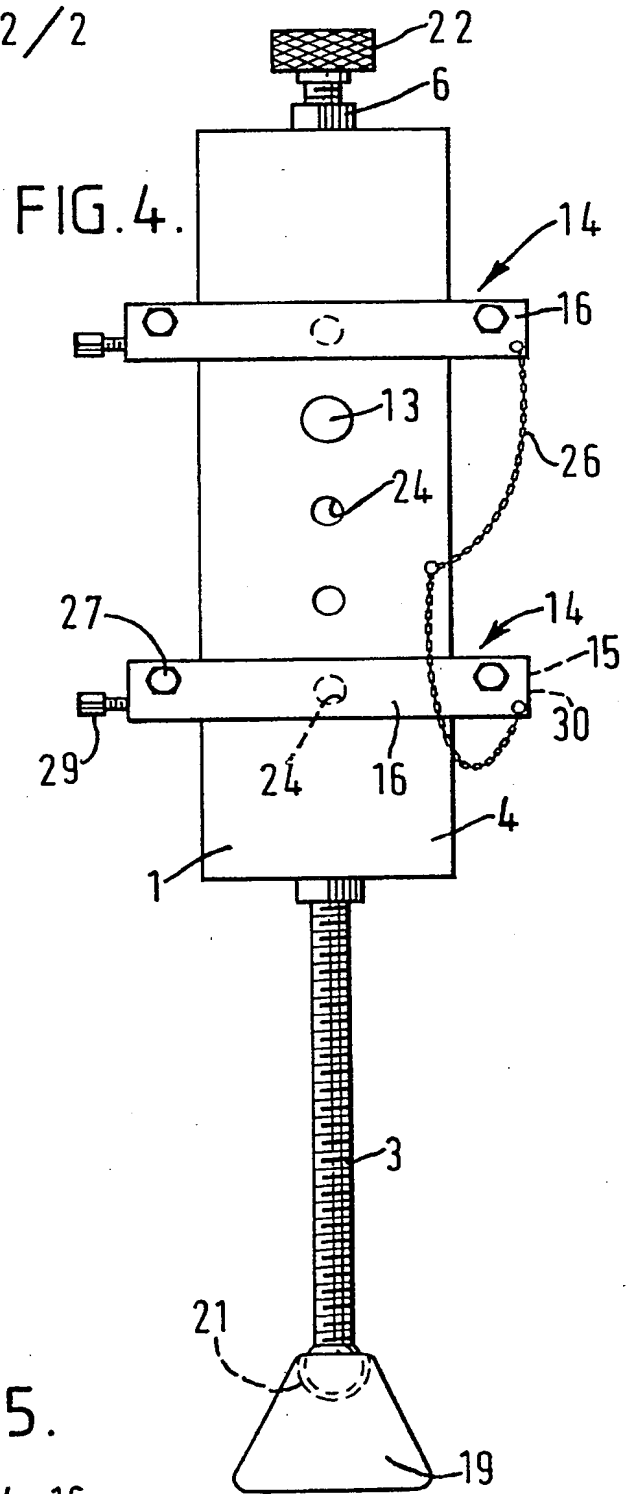
The drawings originally filed were informal and the print here reproduced is taken from a later filed formal copy.

GB 2 124 691 A





2/2



SPECIFICATION

Levelling

- 5 This invention relates to the levelling of a ladder or the like for use on a sloping or stepped surface.

Ladders, which may be of metal, plastics, wood, or of mixed material construction are universally employed by householders and workmen of every kind where there is a need for access to or work at a height above a surface. However, the surface concerned at any particular location may not be level. It may slope or it may be stepped. There are three alternative approaches to this problem. The user of the ladder may choose to ignore the slope or step and to accept the risks of falling from the ladder. Alternatively, packing may be inserted under one leg of the ladder to level it. This solution also has potential safety problems in that the packing may not be sufficiently firm or may become loose. Even this solution is unacceptable where the slope or the step in the surface is substantial, as for example in a stairway. In this case the potential user of the ladder has in the past had to have recourse to other equipment such as planks, trestles or scaffolding.

There is an evident need for a simple cheap and universally applicable device enabling a ladder, even a simple ladder or an extension ladder, to be levelled for use on a sloping or stepped surface,

- 30 In accordance with my invention I provide a device for levelling a ladder or the like for use on a sloping or stepped surface, the device comprising: a body member provided with means for releasably coupling a leg of a ladder or the like to said body member; a base adapted for abutment with the said sloping or stepped surface to provide support for the device and for the leg of the ladder or the like coupled to said body member, the other leg of the ladder or the like being supported directly from the said surface; and an elongate rod arranged to upstand from said base, and supporting said body member, the elongate rod being rotatable relative to the body member and/or to the base and being threadedly engaged with one or both of the body member and the base whereby rotation of the elongate rod is effective to vary the separation between the base and the body member.

All metal ladders are common nowadays and are usually formed with hollow rungs which open through the ladder legs. The preferred coupling means therefore consists of a stud projection adapted to be received horizontally through an opening formed through the leg of the ladder and into the hollow rung. In order that the body member remains in contact with the leg and the stud projection remains inserted into the socket opening defined by the hollow rung and the opening in the leg, releasable clamping means are preferably also provided.

- 60 So that the ladder may be pivoted and in the case of an extension ladder may be raised or lowered so as to form different angles between the horizontal and the ladder leg, the base of my device preferably comprises a foot in which the elongate rod may be rotatable, the foot being adapted for planar contact

with the surface on which the said ladder leg bears via the said device whether that surface be horizontal or sloped.

- My invention is hereinafter more particularly described by way of example only with reference to the accompanying drawings, in which:-

Figure 1 shows a side elevational view of a first embodiment of device constructed in accordance with my invention;

- 75 *Figure 2* shows a side elevational view of the device of *Figure 1* as seen in the direction of the arrow A in *Figure 1*;

Figure 3 and *4* are views similar to *Figures 1* and *2* of a second and preferred embodiment; and

- 80 *Figures 5* and *6* are detailed views illustrating two modifications.

The embodiment of levelling device illustrated in *Figures 1* and *2* of the accompanying drawings has a body member 1, a base 2 and an elongate rod 3 which upstands from the base 2 and supports the body member 1.

- Body member 1 which is suitably formed of 5 mm. thick mild steel comprises a face plate 4 adapted, as will be explained, to abut the side surface of a ladder leg, and cross pieces 5 provided with threaded sockets 6 for co-operation with the elongate rod 3 which is correspondingly threaded. The sockets 6 may conveniently consist of nuts welded to the cross pieces 5. The lower end 7 of the elongate rod 3 is in this embodiment formed without thread and received in and rotatable relative to the base 2. Base 2 comprises a foot 8 channel shaped in section as shown in *Figure 1* and suitably formed of 5 mm. thickness mild steel plate. The foot is provided with a shoe 9 pivotally mounted at 10 to the respective side plates 11 of foot 8 and including a bottom surface 12 which may be provided with a non-slip rubber surface for abutment with the ground or other surface.

- 105 The body member is provided with means for releasably coupling a ladder leg thereto. In the illustrated embodiment the coupling means includes a stud projection 13 in the form of a rod of 16 mm. diameter welded to and projecting horizontally from the face plate 4 of the body member 1, together with releasable clamping means 14. The rod 13 is adapted in the case of an all metal ladder of the kind formed with hollow rungs which open through the ladder legs, to be inserted through such an opening and into the socket defined by one such hollow rung. In order that the rod 13 may take the weight of the ladder and of its user, the rod must be retained within the socket provided by the hollow rung. To this end, the releasable clamping means 14 are provided so that the ladder leg is retained in facial contact with the face plate 4. In the illustrated arrangement the clamping means 14 comprise a cross plate 15 welded to the back of the face plate 4 and having two openings therein arranged to receive respective 8 mm. bolts. The bolts pass on either side of the ladder leg and a clamping plate 16 essentially similar to the cross plate 15 is passed over the distal ends of the bolts and held in place against the inner surface of the ladder leg by co-operating nuts such as 17. I have found this particular form of releasable

clamping means simple to produce from standard parts. It is sturdy and reliable in use. However, since the greater part of the support is provided by rod 13, the clamping means need not be of such robust construction. In certain embodiments it may be sufficient for the clamping means to be in the form of a releasable spring means adapted to bias the ladder leg against the face plate 4.

Since the elongate rod 3 is threadedly coupled to the body member 1 and is rotatably supported from the base 2, turning the elongate member about its axis, suitably by means of the turn screw 18 provided at its upper end will correspondingly vary the separation between body member 1 and base 2 so as to adjust the height of the co-operating ladder leg above the ground or other surface on which shoe 9 rests. In an alternative arrangement, the rod 3 may be coupled to the base 2 by means of a threaded connection of opposite sense to the threaded connection between the elongate rod 3 and the body member 1. Alternatively, the connection between the rod and the body member need not be threaded if the connection between the rod and the base is threaded. What is essential is that rotation of rod 3 should have the effect of raising or lowering the body member relative to the base.

It will be noted that Figure 1 shows a second cross piece 15a similar to cross piece 15. It enables either a second or an alternative releasable clamping means 14 to be employed. It will also be noted that rod 13 is located at a position above the median height of the face plate 4. This enables a degree of adjustment to be made as explained below.

The base 2 is preferably demountable from the end 7 of elongate rod 3 so that the body member 1 may be removed from the elongate rod 3 at its lower end and then re-threaded from the opposite side. It will be understood that the rod 13 will in the revised orientation be positioned below the median height of the face plate 4. This enables the same device to be employed with different ladders and such that the body member 1 can be coupled to the adjacent ladder leg at the lowest possible position providing facial contact between the ladder leg and the face plate over the entire height of the face plate.

In the case of a wooden ladder, a hole must be drilled to suit the rod 13. In order that the ladder leg is not unduly weakened, the user of the ladder will doubtless only wish to drill one such hole in each leg. By the use of the arrangement described in which the body member is reversible by first removing the base, the most appropriate orientation for the body member can be chosen in relation to the position of the hole in the wooden ladder leg.

In use, the ladder will normally lie in a plane making an angle to the horizontal. The pivotal mounting between foot 8 and shoe 9 of base 2 providing a planar surface 12 which may be provided with a non-slip surface will ensure a firm footing and avoid the dangers of an insecure footing which often arise when packing is used beneath a ladder leg as heretofore to level the ladder.

As described hereinabove the rod 3 is rotatable relative to the base 2, but this is not essential. The rod 3 may be solid with the base 2, as for example by

being directly threadedly fastened thereto; but in this case the user must take care to see that the operative angular position of the base in use of a ladder - device in combination is always such that the horizontal axis of pivots 10 is parallel to the horizontal axes of the ladder rungs.

I have developed an improved embodiment of my levelling device which is illustrated in Figures 3 and 4 of the accompanying drawings. Where possible like reference numerals are used for like parts to the parts of the first described embodiment.

It will be noted that in place of the base 2 of the embodiment of Figures 1 and 2, my preferred embodiment of levelling device has a universally positionable foot 19 coupled to the end of the elongate threaded rod 3 by a ball-and-socket joint. As shown, the ball 20 is formed on the end of rod 3, socket 21 being formed in foot 19. The bottom surface 12 is provided with a non-slip rubber surface for abutment with the ground or other surface, as in the previous embodiment. The opposite end of threaded rod 3 is provided with a knurled head 22 which may be easier to handle than the turn screw 18 in the embodiment of Figures 1 and 2.

I have found that for best results in use, the body member of my levelling device should be clamped to the leg of a ladder at two spaced points in addition to the stud being received in the lowermost hollow rung of a conventional all metal ladder. I therefore provide in my preferred embodiment two sets of releasable clamping means 14. To allow for maximum flexibility to enable my levelling device to be used generally, no matter what the spacing of the lowermost rung from the ladder foot, and to enable the greatest possible range over which my device can accommodate discrepancy in ground level or the like as between the two legs of a ladder, the preferred embodiment has a projecting rod 13 which is adjustable in position. To this end, the end portion of rod 13 is threaded at 23, received through one of a series of through apertures 24 in body member 1 and held in position by a nut or other suitable fastening means 25.

In the embodiment of Figures 1 and 2, the parts of my specifically described clamping means 14, namely the bolts, clamping plate 16 and co-operating nuts 17 were demountable. Indeed, at least the plate 16 and the nut 17 were necessarily removable in order to fit the device to a ladder leg. Such parts may easily become mislaid once removed; and in my preferred embodiment of Figures 3 and 4 I have sought to overcome this problem. Specifically, the respective clamping plates 16 are connected to the body member by a lightweight chain 26 or the like. The openings in plate 16 are key-hole shape enabling the heads of screws 27 permanently received in a corresponding threaded socket of cross plate 15 to pass through the wider portion of the key-hole shape, the narrower dimension of the key-hole shape being intermediate the diameters of the shank and head of screws 27. It will be noted that to provide a co-operating socket for the screws 27, the sides of cross plate 15 are extended forwardly. In these extending portions 28, further headed screws 29 are received through openings and are adapted to

bear against the edge of a ladder leg in use so that a ladder leg is firmly clamped in use between body member 1 and the two plates 16 in one direction and between the distal ends of screws 29 and extending portions 30 at the opposite ends of cross plates 15 in a perpendicular direction. I have found that this arrangement provides a very firm and secure connection between my device and a ladder leg while at the same time allowing the device readily to be demounted from the ladder leg when no longer required or for fixing to another ladder. My device, and particularly so the preferred embodiment, is very easily mountable when required by the user, whether he be a householder or a workman. No skills are required. The device is readily removable from the ladder when not required and, in the preferred embodiment, the parts of the clamping means are not readily likely to become misplaced.

Other forms of clamping means will occur to persons skilled in this art. For example, as shown in the scrap view of Figure 5, the cross plate 15 may be provided with toggle-action fastening means comprising a T-shaped piece with a threaded shank 31, the whole being pivotable about an axis 32. Shank 31 is received in a slot 33 opening at the edge of clamping plate 16, the nut 34 then being tightened.

Yet another form of clamping means is shown in the scrap view of Figure 6. The clamping plate 16 in this case is hingedly connected to one of the extending portions (here 30). The length of the extended portion 30 must exceed the maximum width for a ladder leg. The other end of the plate 16 is coupled to the other extending portion 28 by means of a screw 27 and key-hole shape opening as described hereinabove.

In order to allow for different widths of ladder leg, further headed screws 35 are provided through the face plate 4 in order to bear against the opposite side of the ladder leg from the plate 16. This arrangement has the advantage that there is not even a chain such as 26 to become detached. The plate 16 is permanently coupled to the remainder of the device.

I have found that the described embodiments of my device are equally suitable for maintaining a ladder level when positioned on sloping ground where the disconformity in level between the ground surface at the two legs is not great, and also for supporting a ladder in a stairway where the disconformity between the support surfaces at the positions of the two legs of the ladder may be substantial and amount to the height of one or more steps.

CLAIMS

1. A device for levelling a ladder or the like for use on a sloping or stepped surface, the device comprising: a body member provided with means for releasably coupling a leg of a ladder or the like to said body member; a base adapted for abutment with the said sloping or stepped surface to provide support for the device and for the leg of the ladder or the like coupled to said body member, the other leg of the ladder or the like being supported directly from the said surface; and an elongate rod arranged to upstand from said base, and supporting said body

member, the elongate rod being rotatable relative to the body member and/or to the base and being threadedly engaged with one or both of the body member and the base whereby rotation of the elongate rod is effective to vary the separation between the base and the body member.

2. A device according to Claim 1, wherein the releasable coupling means comprises a stud projection adapted to be received within the hollow rung of a ladder of the type having hollow rungs or through a through opening provided for the purpose in a ladder leg.

3. A device according to Claim 1 or Claim 2, wherein the coupling means comprises releasable clamping means for clamping the body member into facial contact with the side of a ladder leg.

4. A device according to Claim 3, wherein the clamping means includes a clamping plate adapted in use to be placed on the inner side of the ladder leg and being provided with openings therein for receiving threaded fastening means which, when tightened clamp the ladder leg between the body member and the clamping plate.

5. A device according to Claim 4, wherein the openings in the clamping plate are generally key-hole in shape enabling the head of the fastening means to be received therethrough whereby the fastening means need not be demounted from the body member in order to mount the device or to demount the device from a ladder leg.

6. A device according to Claims 4 or 5, further including flexible connection means preventing the clamping plate from being completely detached from the body member.

7. A device according to any of Claims 3 to 6, wherein the body member further includes extending portions adapted to lie alongside the respective edges of the ladder leg on both sides thereof, one said extending portion including a through threaded opening and being provided with a co-operating tightening screw whereby the ladder leg is enabled to be clamped at its respective edges between the tightening screw and the other said extension.

8. A device according to Claim 2 or any claim appendant thereto, wherein the stud projection comprises a rod having a threaded end adapted by means of a co-operating nut to be fixed in one of a plurality of through openings provided in said body member.

9. A device according to Claim 4 or 5, wherein the body member includes extending portions adapted to lie alongside the respective edges of the ladder leg on both sides thereof, the clamping plate being hingedly connected to one said extending portion.

10. A device according to Claim 9, wherein the body member is provided with at least one tightening screw for bearing against the other side of a ladder leg from the said clamping plate, whereby the device can accomodate ladder legs of substantially different widths.
11. For levelling a ladder or the like for use on a sloping or stepped surface, a device substantially as hereinbefore described with reference to and as shown in the accompanying drawings.

Printed for Her Majesty's Stationery Office, by Croydon Printing Company Limited, Croydon, Surrey, 1984.
Published by The Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.

